

### **Remarks**

This Amendment responds to the Office Action in the above-listed matter dated 5 February 2008.

This Amendment is being filed within the three-month shortened statutory response period indicated by the Office Action, so no late fees are required. The present amendment reduces the total number of claims by nine (9) from the amount previously paid for, and decreases the number of independent claims by one (1) over the number previously paid for. Accordingly, no fees are necessitated for the claim amendments made herein.

This Amendment is accompanied by a Supplemental Information Disclosure Statement and fees associated therewith. Said fees are enclosed herewith by way of credit-card authorization form.

**For the Information Disclosure Statement:**

The Office Action indicated that information referred to in the Information Disclosure Statement filed with the Application was not considered as to the merits, stating that items in the Non Patent Literature Documents section failed to show appropriate dates. A Supplemental Information Disclosure Statement including the non-patent literature contents of the original-filed Information Disclosure Statement with appropriate dates and additional references is enclosed herewith, along with fees. Consideration as to the merits is respectfully requested.

**For the Claims:**

Applicant originally submitted claims 1-65, of which claims 1, 30, 38, and 45 were independent claims. This Office Action rejected claims 1-65 over cited prior art. Applicant hereby cancels claims 14, 38-44, and 54, amends claims 1, 30, 31, and 45, and retains the remaining claims (i.e., claims 2-13, 15-29, 32-37, 46-53, and 55-65) as originally filed. Applicant respectfully requests reconsideration.

**Rahman:**

The Office Action rejected claims 1, 30, and 45 under 35 U.S.C. 102(e) as being anticipated by Rahman et al. (U.S. Pub No. 2003/0174783, hereinafter "Rahman"). Relevant portions of Rahman for the purposes of evaluating claims 1, 30, and 45 may be seen at Fig. 2 and paragraphs [0022]-[0023].

Rahman discloses down samplers 64 and 68 which are included in a feedback path 38 and respectively operate on I-analog signal 50 and Q-analog signal 58. I-analog signal 50 and Q-analog signal 58 are not RF signals since they are obtained upstream of the I/Q modulator 60. The results of the down sampling at down samplers 64 and 68 are analog signals 66 and 70. Downstream of down samplers 64 and 68, analog signals 66 and 70 are converted into digital form at an A/D converter 74. The down-sampling of down samplers 64 and 68 is by a ratio of "D" with respect to the sampling rate of D/A converters 52 and 44. The D/A must be sampled at a higher rate than the signal bandwidth. But due to the down sampling, the A/D converter can be much lower than the D/A sampling rate. This results in significant aliasing. But the significant aliasing does not affect the DC offset and I/Q imbalance correction performance, which is the limited purpose to which the Rahman feedback signal path 38 is provided.

Thus, Rahman performs no down conversion in its feedback path 38, the Rahman feedback path 38 operates on baseband analog signals, and Rahman states nothing to indicate that a down conversion is being performed. Rather, Rahman uses down-sampling to collapse all baseband frequency information into a very narrow band, thereby destroying the frequency-dependent information that might have otherwise been present in the baseband I- and Q- analog signals 50 and 58, which is another way of saying what Rahman teaches about significant aliasing occurring. In Rahman, the bandwidth of the forward signal passed through D/A's 52 and 44 is not preserved in the baseband feedback signals generated by A/D 74. Rahman discloses a narrowband, baseband application that teaches away from that which the applicant claims in claims 1, 30, and 45.

Claim 1:

Claim 1 has been amended to recite limitations related to the feedback section comprising a complex-digital-subharmonic sampling downconverter. This limitation was originally included in claim 14, and this amendment cancels claim 14. The Office Action applied the same rejection to claims 1 and 14 (i.e., 102(e) based on Rahman). As discussed above, Rahman fails to teach of a downconverter, much less a complex-digital-subharmonic sampling downconverter, and the Rahman "significant signal aliasing" baseband feedback technique can't possibly correct for "frequency dependent quadrature gain and phase imbalance" as recited in applicant's claim 1 because the frequency dependent feedback information has been obliterated through the aliasing.

In order to further clarify the subject matter applicant regards as his invention, claim 1 has been further amended to recite limitations that relate bandwidths in the complex-forward-

data steam and complex-return-data stream. More specifically, claim 1 is amended to recite that the complex-forward-data stream digitally conveys information within a bandwidth and that the feedback section provides the complex-return-data stream at greater than or equal to the bandwidth. This is something that Rahman teaches away from by teaching down sampling and forming a feedback signal with significant signal aliasing.

Support for these bandwidth-related limitations may be found throughout applicant's specification. For example, paragraph [0050] discusses how complex-forward-data stream 108 is a wideband data stream, and paragraph [0051] discusses how complex-peak-reduced-forward-data stream 112 exhibits no spectral regrowth. Paragraphs [0055] and [0063] then discuss how complex-quadrature-balanced-equalized-forward-data stream 118 is desirably a super-wideband signal, and paragraph [0089] discusses how clock frequency for A/D 304 is configured to satisfy the Nyquist criteria for the super-wideband signal discussed above. No new subject matter is added by the amendment to claim 1.

Accordingly, applicant's invention as defined by claim 1 is not anticipated by Rahman because Rahman teaches neither the complex-digital-subharmonic sampling downconverter limitation nor the bandwidth limitations recited in claim 1, as discussed above. Moreover, neither is the invention defined in claim 1 obvious over Rahman, either taken alone or in combination with the other prior art of record. Rahman teaches away from applicant's claimed invention as defined in claim 1. Instead of teaching applicant's invention as defined in claim 1, Rahman teaches of a narrowband feedback signal generation technique responsive to a baseband signal and addressed only to compensating for a couple of aliasing-insensitive parameters.

For the reasons set forth above, applicant believes claim 1 to be allowable. Reconsideration is respectfully requested.

Claim 30:

The original claim 30 included a digital-subharmonic-sampling downconverter limitation, but was rejected as being anticipated by Rahman. As explained above in connection with claim 1, this rejection is believed to be improper because Rahman fails to teach of any downconverter, much less a digital-subharmonic sampling downconverter. To improve clarity, relative bandwidth limitations like those discussed above in connection with claim 1 are also included in claim 30. Accordingly, claim 30 is believed to be allowable for substantially the same reasons as were presented above in connection with claim 1. Reconsideration is respectfully requested.

Claim 45:

Claim 45 has been amended to recite that the down-converting activity uses a digital-subharmonic-sampling downconverter. This limitation was originally included in claim 54, and claim 54 has been canceled. The Office Action applied the same rejection claims 45 and 54 (i.e., 102(e) based on Rahman). In addition, relative bandwidth limitations like those discussed above in connection with claim 1 are also added into claim 45. Accordingly, claim 45 is believed to be allowable for substantially the same reasons as were presented above in connection with claim 1. Reconsideration is respectfully requested.

Claims 2-3, 26-27, 51-52, and 63:

Claims 2 and 63 were rejected as being anticipated by Rahman. Claims 3, 26-27, and 51-52 were rejected as being obvious over Rahman in view of Sarca (U.S. Pub No 2005/0123066). Claims 2-3 and 26-27 depend from claim 1 and are believed to be allowable for the reasons set forth in above connection with claim 1. Claims 51-52 and 63 depend from claim 45 and are believed to be allowable for the reasons set forth above in connection with claim 45.

But claims 2-3, 26-27, 51-52, and 63 are believed to be allowable for additional reasons as well. Claim 2, from which claim 3 depends, and claim 26, from which claim 27 depends, each recite that the feedback section includes a first analog input adapted to receive a first RF-analog signal from the power amplifier input along with a second analog input adapted to receive a second RF-analog signal from the power amplifier output. Claim 51, from which claim 52 depends, recites that the first feedback signal is derived from the power-amplifier-input signal and the method additionally comprises down-converting a second feedback signal derived from the power-amplifier-output signal. Claim 63 recites that the first feedback signal is derived from the power-amplifier-input signal and that after downconverting the first feedback signal a second feedback signal derived from the power-amplifier-output signal is downconverted. Neither Rahman nor Sarca disclose these limitations, either when viewed alone or in combination with one another.

Rahman does not disclose any power amplifier and does not even feedback a single RF analog signal, much less two different RF analog signals. With respect to the claim 2 and claim 63 anticipation rejections, the Office Action alleges that Rahman inherently teaches of such a thing, but this allegation is

clearly incorrect. Rahman does not inherently teach the use of two RF-analog signals (claim 2) or power-amplifier-input and output signals (claim 63) because Rahman uses no RF feedback signal at all but teaches the use of a single complex baseband analog signal.

Sarca discloses a power amplifier and teaches feeding back a single RF signal derived from the output of the power amplifier. Neither reference teaches feeding back an RF signal from the input of the RF amplifier, much less from both the input and the output. Moreover, claims 3, 26-27, and 51-52 recite a sequence of using the two different RF analog signals that neither Rahman nor Sarca discloses.

For these additional reasons as well as being dependent upon allowable claims, applicant believes that claims 2-3, 26-27, and 51-52 are allowable. Reconsideration is respectfully requested.

**Claims 6 and 48:**

Claims 6 and 48 were each rejected as being obvious over Rahman in view of Sarca. Claim 6 depends from claims 4 and 1, while claim 48 depends from claims 47, 46, and 45. Claim 6 is believed to be allowable for the reasons set forth above in connection with claim 1, and claim 48 is believed to be allowable for the reasons set forth above in connection with claim 45.

But claims 6 and 48 are believed to be allowable for additional reasons as well. Each of claims 6 and 48 recite limitations directed to an adaptation engine which accommodates a partial complex equalizer. No such adaptation engine which accommodates a partial complex equalizer is disclosed or suggested by either Rahman nor Sarca. In connection with claim

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6, the Office Action references paragraph [0051] of Sarca as providing a teaching of the claim's limitations. But that paragraph provides no teaching whatsoever about an adaptation engine which accommodates a partial complex equalizer. In connection with claim 48, the Office Action makes no mention of this limitation or allegation that is disclosed in Sarca or elsewhere. Since the limitations of claims 6 and 48 are neither taught nor suggested by Rahman or Sarca, applicant believes that claims 6 and 48 are allowable for these independent reasons as well as being dependent upon allowable claims. Reconsideration is respectfully requested.

Claims 12-13, 32-33 and 65:

Claims 12-13, 32-33, and 65 were rejected as being anticipated by Rahman. Claims 12-13 depend from claim 1 and are believed to be allowable for the reasons set forth above in connection with claim 1. Claims 32-33 depend from claim 30 and are believed to be allowable for the reasons set forth above in connection with claim 30. Claim 65 depends from claim 45 and is believed to be allowable for the reasons set forth above in connection with claim 45.

But claims 12-13, 32-33, and 65 are believed to be allowable for additional reasons as well. Each of claims 12-13, 32-33, and 65 includes a limitation directed to the relative resolution between forward and return streams. In particular, the return stream is recited as exhibiting less resolution than the forward stream. This limitation is not discussed, suggested, or otherwise taught in any of the prior art references of record, including the Rahman reference.



The Office Action summarily concludes that this limitation is inherently disclosed in Rahman and refers to Fig. 2 element 38. But Rahman teaches no such thing at the referenced location or elsewhere. And this teaching is clearly not inherent because the Rahman system would work just fine if the forward and return paths exhibited equal resolution or if the return path exhibited a greater resolution than the forward path. Since this limitation is not taught or suggested in the referenced prior art, applicant believes that claims 12-13, 32-33, and 65 are allowable for these independent reasons as well as being dependent upon allowable claims. Reconsideration is respectfully requested.

**Claims 15-19, 34-37 and 57-60:**

Claims 15, 16, 18, 34, 36, 37, 42, 57, and 58 were rejected as being anticipated by Rahman. Claims 17, 19, 35, and 59-60 were rejected as being obvious over Rahman in view of Sarca. Claims 15-19 depend from claim 1 and are believed to be allowable for the reasons set forth above in connection with claim 1. Claims 34-37 depend from claim 30 and are believed to be allowable for the reasons set forth above in connection with claim 30. Claims 57-60 depend from claim 45 and are believed to be allowable for the reasons set forth above in connection with claim 45.

But claims 15-19, 34-37, and 57-60 are believed to be allowable for additional reasons as well. Each of these claims recites limitations directed toward producing a delayed-complex-forward-data stream that is temporally aligned with the complex-return-data stream. This limitation is not disclosed or suggested in the prior art or record, including Rahman and Sarca.

The Office Action summarily alleges that this feature is inherently disclosed in Rahman and refers to paragraphs [0027], [0036], and [0047] of Rahman. These paragraphs contain only vague references to something that may experience some delay. They contain no teaching or suggestion whatsoever concerning the particular data streams recited in these claims (or their equivalents) or the particular temporal alignment recited in these claims (or the equivalent). These limitations are clearly not inherent in the Rahman disclosure because Rahman has no need of the precise sort of delay recited in these claims. The lack of any teaching whatsoever does not automatically indicate that the teaching is inherent.

Since the limitations of claims 15-19, 34-37, and 57-60 are neither taught nor suggested by the prior art, applicant believes that claims 15-19, 34-37, and 57-60 are allowable for these independent reasons as well as being dependent upon allowable claims. Reconsideration is respectfully requested.

**Claim 31:**

Claim 31 was rejected as being obvious over Rahman in view of Rafie et al. (U.S. Pub No 2003/0058959, hereinafter "Rafie"). Claim 31 depends from claim 30 and has been amended herein to track the amendments made to claim 30. Claim 31 is believed to be allowable for the reasons set forth in connection with claim 30.

But claim 31 is believed to be allowable for additional reasons as well. Claim 31 recites a limitation which relates to a particular frequency synthesized by a synthesizer circuit. That frequency has a specifically recited relationship to a local-oscillator signal and is exhibited by the clock signal that

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determines the analog-to-digital converter sample rate. The Office Action alleges that Rafie at Fig. 11 and elements 1126 and 1128, and paragraph [0092] provide a teaching of this limitation. These cited passages provide no such teaching. Rather, Rafie teaches something quite different from that which is claimed in claim 31. Rafie is silent upon the specific relationships between the A/D sampling rate and the local-oscillator signal recited in claim 31. Moreover, Rafie does not teach a digital-subharmonic-sampling downconverter (recited in claim 30) but instead teaches performing a downconversion prior to sampling in the Rafie ADC 1128. Rafie would have no need of following the specific relationships recited in claim 31.

Since the limitations of claim 31 are neither taught nor suggested by the prior art, applicant believes that claim 31, 34- is allowable for these independent reasons as well as being dependent upon an allowable claim. Reconsideration is respectfully requested.

Claims 4-5, 7-11, 20-25, 28-29, 46-47, 49-50, 53, 55-56, and 61-62:

Claims 4-5, 7-11, 20-25, and 28-29 depend, directly or indirectly, from claim 1 and are believed to be allowable for the reasons set forth above in connection with claim 1. Claims 46-47, 49-50, 53, 55-56, and 61-62 depend, directly or indirectly from claim 45 and are believed to be allowable for the reasons set forth above in connection with claim 45.

Conclusion:

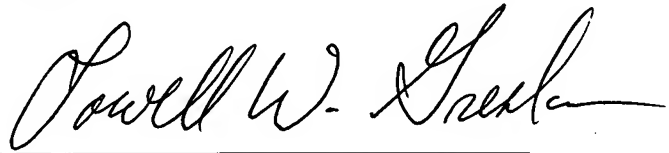
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Applicant believes that the foregoing amendments and remarks are fully responsive to the rejections recited in the 5 February 2008 Office Action and that the present application is now in a condition for allowance. Accordingly, reconsideration of the present application is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, reading "Lowell W. Gresham", written over a horizontal line.

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